State of the Art (SOTA)
Manual

July 1997

State of New Jersey
Department of Environmental Protection
Air Quality Permitting Program

State of the Art (SOTA) Manual

Table of Contents

State of the Art (SOTA) Manual

Table of Contents (Continued)

Section Page Number

1.0 INTRODUCTION

1.1 SOTA Requirements

As promulgated in the New Jersey Air Pollution Control Act N.J.S.A. 26:2C-9.2(c), and as set forth in the implementing regulations of the Air Pollution Control Act (N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.35), newly constructed, reconstructed, or modified equipment and control apparatus is required to incorporate advances in the art of air pollution control developed for the kind and amount of air contaminant emitted by the applicant's equipment or control apparatus.

The Air Pollution Control Act of New Jersey directed the Department to publish technical manuals that would include performance levels with respect to air pollution control, to be used by some permit applicants for demonstrating advances in the art of air pollution control.

"Advances in the art of air pollution control" is commonly referred to as "State-of-the-Art" or SOTA. SOTA generally includes performance limits that are based on air pollution control technology, pollution prevention methods, and process modifications or substitutions that will provide the greatest emission reductions that are technologically and economically feasible.

1.2 SOTA Workgroup

A workgroup was formed in March 1995 as part of the Department's Air Program reengineering efforts to provide advice on the development of technical manuals authorized by the Air Pollution Control Act.

Representatives of industries, businesses and environmental organizations were invited to participate in the workgroup. All meeting dates/time were announced in the Air Program bulletin board. Meeting minutes and meeting dates were distributed to a large mailing list. Public participation in the process was open throughout the development of the technical manuals. A workshop was announced in the NJ Register and held on January 10, 1997. Table 1 lists the chairs and task leaders of the SOTA workgroup.

The technical manuals contained in Section 3 of the SOTA manual have been developed with significant input from the State of the Art Workgroup, and have been published after being subjected to public review and comment.

1.3 Applicability of SOTA

To determine what equipment and air pollution control apparatus must have documentation of advances in the art of air pollution control (i.e. SOTA), one must refer to N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22. For each regulated air pollutant these

Table 1
STATE OF THE ART MANUALS

WORKGROUP CHAIRS
Iclal Atay, Ph.D., Chief - Bureau of Air Quality Engineering
Thomas J. Detweiler, Associate Director, Regulatory Affairs - CIC of New Jersey

	TITLE	DEP LEAD	INDUSTRY LEAD
1	VOC Storage Tanks	Bob Darrow	Eric DeGesero Fuel Merchants of NJ
2	Transfer Operations	Max Friedman	Eric DeGesero Fuel Merchants of NJ
3	Petroleum Refineries	Bachir Bouzid	Sherman Brown Bayway Ref. Co.
4	Asphalt Plants	Mike Adhanom	Rich Gribbin Stone Industries, Inc.
5	Chemical/ Pharmaceutical Industries	Max Eslambolchi	Stacey Starkman Merck&Co., Inc.
6	Surface Cleaners/Degreasers	Michael Sabol	----------
7	Surface Coating Operations	Max Friedman	Vickie Keenan Assoc. Of Graphic Comm.
8	Ethylene Oxide Sterilizers	James Bridgewater	----------
9	Municipal Waste Water Treatment	Bachir Bouzid	----------
10	Site Remediation	Joel Leon	John Cuifo Ground Water & Env. Servs
11	Bakery Ovens	George Snyder	Ann Giesecke American Bakers Ass.
12	Boilers	Yogesh Doshi James Bridgewater	Dan Cunnigham Atlantic Electric
13	Internal Combustion Engines	Ketan Bhandutia Douglas Bruckman	----------
14	Stationary Gas Turbines	Raj Patel Ketan Bhandutia	Richard Dunk GPU
15	Glass Industry	Max Friedman	Robert Elegante Weaton
16	Paint, Ink and Adhesive Industries	Mike Adhanom	Joe McCloskey Benjamin Moore&Co.
17	Graphic Arts Industry	Max Friedman Mike Adhanom	Vickie Keenan Assoc. of Graphic Comm.

regulations set forth deminimis levels below which a permit applicant would not be required to document SOTA.

While smaller equipment and air pollution control apparatus is not required to have SOTA documentation for permitting purpose, the owner/operators of that equipment are still expected to use technology and operating practices that minimize air pollution. The Department may in the future promulgate rules for smaller sources if it is observed that best available air pollution control practices are not being used.

1.4 SOTA Documentation

Refer to N.J.A.C. 7:27 for regulatory requirements.

Any applicant, who is filing a permit application with the Department for a newly constructed, reconstructed, or modified equipment and control apparatus for which incorporation of SOTA is required for a particular air contaminant, can document advances in the art of air pollution control, as follows:

a) For an air contaminant subject to LAER (Lowest Achievable Emission Rate) requirement pursuant to N.J.A.C. 7:27-18, compliance with LAER requirement for that air contaminant represents SOTA. LAER is a case by case determination;

b) For an air contaminant subject to BACT (Best Available Control Technology) requirements pursuant to 40 CFR 52.21, compliance with BACT requirements for that air contaminant represents SOTA. BACT is a case by case determination;

c) For an air contaminant that is a Hazardous Air Pollutant (HAP) for which Maximum Achievable Control Technology (MACT) requirements have been promulgated in 40 CFR 63, compliance with MACT represents SOTA;

d) For an air contaminant for which New Source Performance Standards (NSPS) have been promulgated on or after 8/2/95, compliance with the NSPS represents SOTA;

e) For any other contaminant, SOTA can be documented as follows:
   i) An applicant documents compliance with a SOTA Manual;
   ii) An applicant proposes a case- by-case determination of, as outlined in Section 1.5 below; or
   iii) An applicant documents compliance with a general permit, issued under N.J.A.C. 7:27-8.8 that applies to the source.

1.5 Case-by-Case SOTA

Refer to N.J.A.C. 7:27 for regulatory requirements.

Case-by- case SOTA determination analysis is made by using a "Top Down" approach. To perform a "Top Down" approach, a list of air pollution control technologies that may be applied to the source must be identified and evaluated. The control alternatives should not be limited to existing controls for the source category. The list must include controls applied to similar type of sources, innovative control technologies, modification of the process or process equipment, other pollution prevention measures, and combination of these measures. Measures must be listed in descending order of air pollution control effectiveness. If the most effective technology is not selected, then the following must be performed:

i) A demonstration that the more effective measure is technically infeasible, based on physical, chemical, or engineering principles, and/or technical difficulties that would prevent the successful application of the measure;

ii) A demonstration that the top measure should be eliminated from consideration based on its environmental impacts. The justification must show that the adverse environmental effects of the top measure (for example, effects on water or land, HAP emissions, or increased environmental hazards), when compared with its air contaminant emission reduction benefits, would make use of the top measure unreasonable;

iii) A demonstration that the top measure should be eliminated from consideration based on its economic impacts calculated using the techniques in the latest edition of EPA's Control Cost Manual. The justification must show that the total and incremental costs of the to measure are greater than the total and incremental costs of the proposed measure(s); and that the extra costs, when compared with the air contaminant emission reduction benefits resulting from the top measure, would make use of the top measure unreasonable; or

iv) A demonstration that the top measure should be eliminated from consideration based on its energy impacts. The justification must show that the top measure uses fuels that are not reliably available; or that the energy consumed by the top measure is greater than the proposed measure(s), and that the extra energy used, when compared with the air contaminant emission reduction benefits resulting from the top measure, would make use of the top measure unreasonable; and

If the top measure is eliminated from consideration, the applicant should evaluate each successive measure on the list, using the procedures described above, until a measure is reached that is not eliminated. This measure would constitute the case by case SOTA for the source.

2.0 SCOPE

2.1 Pollution Prevention

In developing the technical manuals, emphasis was placed on pollution prevention measures.

Known pollution prevention techniques that include the use of cleaner/safer/non toxic/non hazardous materials in the manufacturing processes, energy efficiency and/or process modifications were evaluated and incorporated into the SOTA performance levels.

Where appropriate, less stringent performance levels were specified for one air pollutant because emissions of other air pollutants would be avoided, and the combined emissions represent SOTA.

2.2 The Impact on the Permit Applicants

The State of the Art (SOTA) Manuals provide information on SOTA performance levels for air contaminant emissions and air pollution control technologies and pollution prevention methods that achieve these levels and minimize emissions of air contaminants. This information will significantly reduce the burden on the permit applicants in preparing the documentation to demonstrate to the Department that their proposed equipment and operating practices incorporate Advances in the Art of Air Pollution Control as required pursuant to the Air Pollution Control Act N.J.S.A. 26:2C-9.2(c).

2.3 Updating the SOTA Manual

These technical manuals will be reviewed periodically and revised to reflect updated technology, methods, and performance levels to ensure that they reflect the most current advances in the art of air pollution control. The frequency at which these manuals are expected to be revised is stated in the individual manuals, but may be different depending on a number of factors. These factors include the prospect that new air pollution control technologies or air pollution prevention methods will become available. For example, a source that is in a rapidly expanding industry and for which new control technologies have been developed recently or are currently being developed might have a more frequent review schedule than a source category for an industry that is not experiencing economic growth or introduction of emission control measures.

If the Department revises a technical manual, the new SOTA performance levels will apply only to applications submitted after the final publication of the amended technical manual. Revisions of technical manuals will be subject to public review and comment.

2.4 Source Operations Addressed by the Technical Manuals

Source operations for which technical manuals have been developed are:

1. VOC Storage Tanks
2. Transfer Operations
3. Petroleum Refineries
4. Asphalt Plants
5. Chemical/ Pharmaceutical Industries
6. Degreasers/ Surface Cleaners
7. Surface Coating Operations
8. Ethylene Oxide Sterilizers and Fumigators
9. Municipal Waste Water Treatment
10. Non Hazardous On-Site Remediation Processes
11. Bakery Ovens
12. Boilers
13. Internal Combustion Engines
14. Stationary Gas Turbines
15. Glass Plants
16. Paint, Ink, and Adhesive Manufacturing Industries
17. Graphic Arts Industry

The SOTA Manuals for each of these source categories are included in Section 3.

2.5 Air Contaminants not addressed by the Technical Manuals

Source operations may emit several air contaminants. Not all air contaminant that may be emitted from a given source operation are addressed in the technical manuals. Other air contaminants that would be emitted from the source operations, but that are not addressed in the technical manuals must be evaluated on a case by case basis; if emitted over the deminimis amounts specified in N.J.A.C. 7:27-8 and 22.

2.6 Permit Decisions - Other Air Pollution Control Requirements

Compliance with SOTA is one of the requirements that a permit applicant must demonstrate to obtain approval for an air pollution control permit from the Department. Air permit applicants must also determine applicability and demonstrate compliance with all other applicable air pollution control rules. These include:

- New Jersey Air Pollution Control rules codified in N.JA.C. 7:27
- New Source Performance Standards codified in 40 CFR 60
- National Emissions Standards for Hazardous Air Pollutants, and Maximum Achievable Control Technology codified in 40 CFR 63

- New Source Review requirements for areas that are not in attainment with the ambient air quality standards for criteria pollutants, codified in 40 CFR 51.165. New Jersey regulates NSR at N.J.A.C. 7:27-18, the Emission Offset Rule.
- Prevention of Significant Deterioration (PSD) of Air Quality in areas that are in attainment with ambient air quality standards for criteria pollutants, codified in 40 CFR 52.21. New Jersey has delegation for implementing the federal PSD rules.
- Air Quality Impact Evaluations

  Prior to making a decision on a permit application, the Department must also determine that the proposed emissions of air pollutants from the source operations will not cause an unacceptable degradation of air quality. This determination involves some degree of air quality impact assessment for certain air contaminants, and for some pollutants a subsequent health impact assessment. If these assessments indicate that the source may cause an unacceptable degradation of air quality, the permit applicant must evaluate and implement additional air pollution control measures beyond the SOTA performance levels specified in the technical manuals, to protect public health.

3.0 TECHNICAL SOTA MANUALS

3.1: State of the Art (SOTA) Manual for Volatile Organic Storage Tanks

3.2: State of the Art (SOTA) Manual for Transfer Operations

3.3: State of the Art (SOTA) Manual for Petroleum Refineries

3.4: State of the Art (SOTA) Manual for Asphalt Plants

3.5: State of the Art (SOTA) Manual for Chemical and Pharmaceutical Processing and Manufacturing Industries

3.6: State of the Art (SOTA) Manual for Degreasers and Other Solvent Based Metal Surface Cleaners

3.7: State of the Art (SOTA) Manual for Surface Coating Operations

3.8: State of the Art (SOTA) Manual for Commercial Sterilizers and Fumigators using Ethylene Oxide

3.9: State of the Art (SOTA) Manual for Municipal Wastewater/Sludge Handling & Treatment Systems

3.10: State of the Art (SOTA) Manual for Non-Hazardous Onsite Remediation Processes

3.11: State of the Art (SOTA) Manual for Bakery Ovens

3.12: State of the Art (SOTA) Manual for Boilers

3.13: State of the Art (SOTA) Manual for Internal Combustion Engines

3.14: State of the Art (SOTA) Manual for Stationary Gas Turbines

3.15: State of the Art (SOTA) Manual for Glass Industry

3.16: State of the Art (SOTA) Manual for Paint, Ink and Adhesive Manufacturing Industries

3.17: State of the Art (SOTA) Manual for the Graphics Arts Industry